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ABSTRACT

The extent to which a teacher served as a model for the verbal style of his students was examined with the use of a modified form of the Observation Schedule and Record 4V (OSCAR). Four students from each of 24 first grade classes were separated into groups on the basis of frequency of teacher and peer reinforcement. Verbal characteristics of these students were scored using six scales of imitative behavior develcped from the OSCAR protocols. The data were analyzed using a 2 X 2 factorial design (teacher reward X pupil reward). Students observing high rewarding teachers imitated significantly more than those observing low rewarding teachers on 4 of 6 verbal categories. In three of the analyses differences between frequently and infrequently peer-reinforced students were located, and for three of the analyses there were also reliable teacher reward X pupil reward interactions. The potential of the OSCAR for measuring student behavior and constructs such as limitation was demonstrated. (Author/RT)

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The classroom teacher has often been stereotyped as a person who merely imparts knowledge about rather well defined subject matter areas. Such a conception, however, is probably an oversimplification of reality. The teacher may be as important when he acts as a model for, and a reinforcer of, student behavior as when he is a communicator of knowledge. The purpose of this study was to assess the utility of applying reinforcement theory to the observational study of imitative behavior as it naturally occurs within the classroom.

Several authors have contributed to a hypothesis that reinforcing models are imitated to a greater extent than non-reinforcing models, even though the imitation act itself may not be directly rewarded. Mowrer's theory of imitation (1950; 1960) was based on the principle of secondary reinforcement taken from classical learning theory. A child will continue to imitate a model's behavior on occasions where direct reinforcement is not provided, because stimuli associated with a history of reinforcements have acquired secondary reinforcing properties. Bandura and Huston (1961) provided experimental support for this hypothesis. They showed that preschool subjects who had

been given considerable social reward during 30 minutes of play later imitated both the verbal and motor responses displayed by the model to a greater extent than subjects experiencing a similar period of non-rewarding interaction with the model. Social power (Maccoby, 1959) and dependency (Sears, 1957) have been identified as important factors affecting the amount of imitation, with a model often being selected simply because he has demonstrated the power to provide or withhold reward. In addition, such concepts as vicarious and self reinforcement have been employed to explain observed imitative behavior where direct reinforcement of this activity was not provided.

There is also considerable experimental evidence that the behavior of children can be greatly affected by the amount of reinforcement they receive from their peers. For example, Hartup and Coates (1967) demonstrated that the effect of a preschool child's exposure to a rewarding peer model, as compared to a non-rewarding model, depended on the subject's general history of reinforcement from the peer group. Reinforcement giving among young children has been shown to be an operant which comes under the control of other children (Charlesworth and Hartup, 1967). The amount of attention, affection, and cooperation given to other children were all positively correlated with re-

ceiving of each of these reinforcing activities.

In the classroom, the frequency in which a child obtains reinforcement from his peers may modify any effects of teacher reward. The application of contingent positive reinforcement was shown to increase the number of "positive interactions" that a child had with his classmates (Scott, Burton, and Yarrow, 1967). However, in some instances the subject was increasingly frustrated in his efforts to interact in socially approved ways because his peers would not similarly reinforce such behaviors. In a similar situation Wahler (1967) brought evidence which suggested that peer reinforcement (among other stimuli) takes over when sufficient social reinforcement is not provided by the teacher. McAllister and his associates (1969) noted that peer group behavior may also increase the effect of teacher reinforcement. Their investigation considered inappropriate and disruptive behaviors occurring among high school students. In this case the authors felt that praise statements from the teacher which were directed at the entire class helped to generate peer group pressure to reduce inappropriate behavior, inasmuch as such praise was contingent on the entire group's behavior.

The findings reviewed above may be summarized in that they 1) support a theory of imitation in which indirect or secondary aspects of reinforcement play a major role, and 2) suggest that peer group reinforcement may modify

the effect of a rewarding model. Along these lines, the following experiment examined the extent to which the verbal style of a classroom teacher serves as a model for a student's verbalizations, and the effect of classroom reinforcement on this imitation process. Two aspects of reinforcement were considered, 1) the frequency of reward from the teacher, and 2) the amount of social approval and acceptance that the student received from his classmates.

Some directional predictions were formulated prior to the classroom observations. It was expected that highly rewarding teachers would produce more imitation than teachers who infrequently reward their students. However, it was felt that this difference would be most apparent for students who were not receiving a high degree of social acceptance from their peers. This hypothesis was based on the assumption that those children who received little positive peer reinforcement would develop a strong "need" for reward from other sources. Through imitation this student would be seeking identification with, and reward from, the second most convenient source within the classroom, the teacher, to a much greater extent than the student "satiated" with reinforcement from his peers.

Method

Subjects. The teacher and selected students in each of 24 first grade classes underwent repeated observation. All of the teachers were female, while the student sample

was equally divided by sex. The classes observed contained an average of 23 students ranging in age from 5.5 to 6.7 years.

Materials. The Observation Schedule and Record 4V (OScAR), an instrument designed to allow a single, naive observer to objectively discriminate among and record 42 separate categories of verbalizations normally occurring in the classroom, was used to collect data. Two separate versions of the instrument were employed: The original OScAR 4V developed by Medley and his colleagues (1968) for recording teacher behavior, and an adaptation for concentrating on pupil verbalizations made in a small peer group situation (Student OScAR). The Student OScAR is a virtual duplicate of the OScAR 4V with an individual student being rated in exactly the same manner as the teacher, and his peers playing the role of the students. That is, during a small group session a single student is arbitrarily selected and given particular attention. Although the student is involved in normal peer group conversation, his verbal behavior is recorded using the same categories, plus a few additions, that are designated on the OScAR 4V for the teacher. The remaining students in the group are coded in the same manner as the entire class is during teacher observation.

There are only a few major modifications of the original OScAR 4V for its use with students. On the Student OScAR space has been provided for tabulating the amount of

"positive social reinforcement" which the student receives. In addition, by employing a numbered coding system as the scoring unit rather than the uniform mark generally used on the OScAR 4V, a detailed account of precisely to whom a given statement was directed could be tabulated. While this more elaborate record was possible within the small peer group, it was obviously not suitable for the teacher's statements to the entire class.

Observers and Training. Four Northwestern University freshmen Education students were employed as observers. None of these students were familiar with the instruments, nor had they taken any systematic classroom observations prior to this investigation. In training the observers to use the Schedules they were not briefed on the details of the study. However, they were thoroughly acquainted with the type of information gathered by the OScAR instruments. The initial training sessions were spent in giving the observers an explanation of the difference between statements and interchanges on the OScAR, and a detailed description of each of the categories. Examples were given verbally from the OScAR 4V training manual, and Interaction Analysis audio-tapes of actual classroom behavior were provided for recording practice. Observers spent several practice sessions within classrooms trying out the procedures. All this was designed to allow the trainees to gain speed in making decisions about the categories, and to give them some insight into their problems with the instruments.

Additional classroom tapes were provided for practice throughout the study and questions were always encouraged.

Procedure. Before class meetings were arranged with teachers to determine if students would be allowed to form groups and work on their own sometime during the day's lesson. The teachers of classes meeting this requirement were informed that an observer would be in the room, however no indication was given of the kinds of data to be recorded. The observer would spend at least 15 minutes in the room prior to recording his observations, allowing the teacher and pupils to become accustomed to his presence.

Three observational sessions within each class were held over a 4 week period near the end of the school term. On the first visit, a single observer using the OScAR 4V rated the teacher for three 4-minute sessions. Similar accounts of the verbal interaction between a student and his peers were recorded with the Student OScAR on the same day during a period of inter-student activity without teacher interaction. A small group containing at least 4 children (2 males and 2 females) was observed. The 4 students were rated in random order for 1 minute periods, with four 1-minute time segments recorded for each student. On the second visit to the classroom only the verbal activity of students were recorded. Observations were made of two separate groups of 4 students, again recording for 4-minutes on each subject. The final session duplicated

the initial visit, with data being gathered on both student and teacher verbal behavior. In the selection of students for observation no attempt was made to observe either the same or completely different pupils on each visit. Groups were selected randomly for each session, and repeated observations of some students undoubtably occurred.

Design and Analyses. The design employed in this study was similar to that used by Hartup and Coates (1967) in a previous investigation. The observation records were screened for instances in which the teacher verbally dispensed "social reinforcement" during the lesson. Four categories of positive social reinforcers were tabulated:

1) Considering--a statement revealing sensitivity to pupil feelings.
2) Supporting--a praising or enthusiastic response indicating the correctness of a student's behavior.
3) Approving--a non-enthusiastic response indicating acceptance of the student's behavior.
4) Non-Substantive Pupil Initiate Interchange (positive) --a statement indicating that the teacher accepts, approves, or supports a pupil's contribution which does not involve classroom content.

The ratio of the sum of these four categories divided by the total verbal record of the teacher (sum of the tabulations on all OScAR categories) was assumed to be an index of the teacher's frequency of reinforcement. Based on this

"social reinforcement" score for both the first and third sessions, the teachers were divided into two groups: high rewarding teachers (HRT)--those with reinforcement ratios above the median, and low rewarding teachers (LRT)--those below the median.

Also computed were the total number of positive reinforcements received by each student from his peer group during the three sessions. It must be stressed that this score was based on the same four categories of reinforcement frequencies used for the teachers, but it was expressed simply as the sum of these category totals, and not as a proportion of total verbal activity. In addition, it was possible to tabulate instances in which each student received social reinforcement from his peers as recorded in the other children's protocols. This total "peer reinforcement" score was assumed to be a partial index of the social approval that the student was receiving from his classmates at the time. It was on the basis of this total score that the pupils were also divided into two groups: the pupils above the median in number of reinforcements received--frequently reinforced students (FR), and those below the median--infrequently reinforced students (IR).

Similarity between a student's and his teacher's verbal characteristics was employed as an operational definition of imitation. Six categories of verbal behaviors were tabulated from both the student and teacher OScAR schedules:

1) Substantive Ratio -- Ratio of (Substantive interchanges + Informing + Problem structuring) to Total.

2) Continuing-Initiating Ratio -- Ratio of Continuing statements to Initiating statements.

3) Indirect-Direct Ratio -- Ratio of (Supportive + Approving + Accepting statements) to (Non-evaluating + Neutrally rejecting + Rebuking + Criticizing + Directing statements).

4) Statement-Interchange Ratio -- Ratio of all types of statements to all types of interchanges.

5) Divergent-Convergent Ratio -- Ratio of Divergent interchanges to Convergent interchanges.

6) Assumed Dissimilarity -- $D = \sqrt{\left(\frac{X_i}{T}\right)^2 - \left(\frac{Y_i}{t}\right)^2}$. A general measure of imitation; 'X' represents a teacher verbalization, 'Y' represents a verbalization of the observed student, 'T' the total frequency count of teacher verbal behavior, 't' the total student verbal behavior, and 'i' any individual category on the two OScAR schedules.

These verbal indices were selected on the basis of their demonstrated utility and stability over time in several previous studies (Bowers and Vogel, 1967; Cronbach, 1958; Friedman and Bowers, 1970). Table 1 shows the mean values for each of the 5 Ratio measures as computed from the schedules of the 24 teachers and their students. The stability coefficients for each of these measures are also

shown in the Table. These estimates were obtained through an analysis of variance procedure, and indicated some stability of the verbal measures over time.

The degree of imitative behavior was defined as the absolute difference between each of those Ratios on the two observation schedules, and the size of the Assumed Dissimilarity. Mean imitation scores were calculated separately for frequently and infrequently reinforced students in each class, and employed as the unit of analysis. A series of repeated measures analyses of variance were computed, with each of the 6 imitation measures employed as a dependent variable. The between-subjects factors were amount of reinforcement from peers (FR vs. IR), and type of teacher model (HRT vs. LRT). The within-subjects factor consisted of the four 1-minute observation trials on the students.

Results

A summary of the F ratios computed from the 6 analyses is shown in Table 2. None of the analyses revealed a significant effect of observation trials. This is contrary to a number of laboratory results which indicate a general decline in imitative behavior with time (e.g. Hartup and Coates, 1967). A possible explanation for this difference is that Hartup and Coates, and most of the other writers in this area, define imitation as a fairly exact duplication of the model's motor or verbal behaviors. An exact parroting of the teacher was not required in this study,

but only a demonstration of similar verbal characteristics.

A significant main effect of the type of teacher model (HRT vs. LRT) was obtained in the expected direction in 4 of the 6 analyses. That is, subjects who observed a high rewarding teacher reproduced the model's verbal style more frequently than subjects who observed low rewarding teachers. As we anticipated the IR group showed more imitation than the FR group, however, this difference reached significance for only 3 of the measures. The expected interaction between reinforcement from peers and type of teacher was also shown in three of the analyses. Only 3 of 18 F values computed for interactions with the repeated observation factor proved significant.

The significant Teacher x Peer Reinforcement interactions were further analyzed with a series of multiple comparisons using the Newman-Keuls procedure (Winer, 1962). From these tests it was evident that all of the interactions resulted from very similar data patterns. Subjects who had received frequent reinforcement from fellow classmates imitated the HRT significantly more than the LRT. On the other hand, contrary to expectations, for the IR students the differences between HRT and LRT were generally not significant, with the low rewarding teacher often inducing slightly more imitation. In line with the hypothesis, among pupils who observed HRTs subjects who were infrequently reinforced by their peers consistently demonstrated a greater

degree of imitation than those who had received frequent reinforcement, but these values tended not to reach significance. Among the students who were in classes of LRTs, those who were infrequently peer reinforced imitated significantly more than those who received frequent peer approval.

Discussion

In studies with young children Hartup and Keller (1960), and Charlesworth and Hartup (1967) have demonstrated that giving and receiving reinforcement are reciprocal activities. If these behaviors were closely related in the classrooms studied, than a positive correlation between a high rewarding teacher and frequent peer reinforcement for students in that teacher's class should follow. However, for our data the computed correlation coefficient between the teacher's "social reinforcement" score and her student's "peer reinforcement" scores was not significant ($r = .06$), indicating relative independence of these factors.

Some possible explanations for this small correlation estimate as compared to significant coefficients ($p < .01$) ranging from $r = .38$ to $r = .79$ in the Charlesworth and Hartup study (1967) may help to explain some of the characteristics of the OScAR data. In studies where reliable correlations were observed the authors were generally careful to include in their records some sort of evidence that the child received the potentially reinforcing activity. For this, the OScAR schedule makes no provision. Nor were

the OScAR reinforcements coded as to whether they were accepted, rejected, or ignored (Only accepted reinforcements were considered in the Charlesworth and Hartup study (1967)). The occurrence of reinforcement was defined merely in terms of the kind of verbal behavior involved, with no provision for the effect, if any, the action had upon the child perceiving it. Indeed, there was no way of determining from the data the particular student who received the teacher's reinforcement, and no knowledge of the role played by other verbal activities (e.g. punishment) in modifying the effect of teacher reward. Finally, the ratings certainly did not cover all classes of social stimuli having reinforcing value. The teacher's facial gestures, smiles, and other motor activities may play an even more important reinforcing role than the categories of verbal behavior considered. In the following discussion of the results of the analyses of variance, one should keep in mind these numerous limitations on the definition of reinforcement employed in this study.

The analyses revealed that student imitation remained relatively stable across trials. These repeated series of rather short 1-minute observation periods were necessitated by a number of practical considerations. In many of the classes the children were allowed only a short period for small group activities and unrestrained inter-student communication. Twenty minutes of student observations had

to be fit into these short time periods. Four 1-minute observations rather than a single 4-minute session was employed to get a more representative sample of the student's verbal behavior. In almost any 4-minute segment of teacher observation considerable data will be accumulated, since the teacher is generally the focus of classroom verbal activity. This is not true in observing the student, as the center of communication is constantly shifting within the peer group, and a single student's verbal activity may vary considerably within a short period of time. Hence, the 1-minute sessions afforded tabulations within subjects, as well as across time, allowing the use of more powerful statistics in the analysis.

It was shown that observation of a high rewarding teacher increased the imitative behavior of students. Despite the classification of HRT and LRT, it is quite doubtful that the amount of reinforcement which a single child, of a class of 25 students, actually receives differs greatly between the two types of teachers. More likely, it is the perception by the student of the teacher's reinforcement activity towards each of the other 24 students, and towards the class as a whole, that most influences the amount of imitation. It is quite possible that the hope of receiving reward from a teacher who dispenses it frequently deserves more credit for producing imitation than the actual receiving of reward.

An expected main effect was the significantly greater

imitation by the IR than the FR student. An explanation was previously made based on the greater "need" for a source of reward by IR students. Again, whether the teacher is classified as high or low in reward, the actual frequency of reinforcement directed towards a particular IR student would probably not even approach satisfying this need. This may account for the lack of significant differences between imitation of the HRT and LRT by the infrequently reinforced student.

Looking at this from a slightly different point of view, Hill (1967) has stressed a relationship between imitation and anxiety reduction. It is possible that the IR children, who were among students who were relatively cold towards them, were extremely anxious within the classroom. Identification with the teacher through imitation of her verbal characteristics may have resulted in a measure of anxiety reduction. For these children, the teacher's schedule of reinforcement would again make little difference.

An extension of the above arguments may also explain the significant Teacher type x Peer reinforcement interactions. While IR students showed high imitation scores with both kinds of teachers, students who did not have this great "need" for reinforcement, or strong classroom anxiety (FR students), could be more selective in applying strategies to attain reward. In addition, pupils with a background of positive social interaction may have been more sensitive to the different probabilities of receiving rein-

forcement from various individuals. Consequently, these FR students imitated the HRT more readily than the LRT simply because they perceived a greater chance for reward. However, with either teacher type the necessity for intensive imitation by the FR pupil was far below that for the IR student.

The present study gave an indication of the extent to which the teacher's rewardingness influenced the amount of student imitation. The results also contained implications for the importance of peer reinforcement as a variable modifying the effects of teacher reward. The generality of these results must be observed in further research with different measuring instruments and more precise behavioral definitions, and the theoretical implications explored for practical significance.

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TABLE 1

MEAN VERBAL RATIOS AND THEIR STABILITY COEFFICIENTS COMPUTED FROM THE STUDENT AND TEACHER OSCAR SCHEDULES

Measure	Student Means	Stability Coefficient	Teacher Means	Stability Coefficient
Substantive Ratio	.414	.421	.846	.527
Continuing-Initiating Ratio	.193	.387	.410	.582
Indirect-Direct Ratio	.667	.400	2.396	.685
Statement-Interchange Ratio	2.257	.566	3.178	.544
Convergent-Divergent Ratio	1.742	.439	3.885	.350

TABLE 2

REPEATED MEASURES ANALYSES OF VARIANCE FOR THE EFFECTS OF TEACHER AND PEER REINFORCEMENT ON SIX TYPES OF PUPIL IMITATION OVER FOUR OBSERVATION TRIALS

Source of Variation	df	Substant. ive Ratio (F)	Cont.-Init. Ratio (F)	Ind.-Dir. Ratio (F)	Stat.-Int. Ratio (F)	Con.-Div. Ratio (F)	Assume Dissim (F)
Between Ss							
Teacher (A) Reinforce.	1	9.37**	4.29*	1.94	7.90**	2.32	4.75*
Peer (B) Reinforce.	1	5.26*	10.62**	2.08	4.21*	1.00	1.86
A x B	1	5.50*	4.87*	1.00	6.37*	3.17	1.73
Subj./Gps.	44						
Within Ss							
Trials (C)	3	1.09	2.59	1.00	1.77	1.00	1.00
A x C	3	2.55	1.00	1.44	1.86	2.35	1.00
B x C	3	3.24*	1.27	2.03	2.91*	1.00	1.00
A x B x C	3	2.07	3.67	1.00	1.00	1.24	1.00
C x Subj./Gps.	132						

**p < .01 *p < .05 n = 12 scores per cell